

HP OpenView

Storage Mirroring application notes

Guidelines for using Microsoft Virtual Server with Storage Mirroring

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Guidelines for using Microsoft Virtual Server with Storage Mirroring application notes

Document Overview

This document is a *Storage Mirroring* application note. An application note provides guidelines on the use of Storage Mirroring in a specific environment.

This document contains:

- **Document Overview**—Explains what an application note contains, how it should be used, what you need to know before trying to use the application note, and where you can go for more information.
- **Solution Overview**—Explains how the application works with Storage Mirroring and describes the considerations that you must weigh when implementing your Storage Mirroring solution. Review this section to make sure that you understand the theory involved with using Storage Mirroring and your application. Includes both basics, such as system requirements, as well as configuration and environment-specific topics, such as interactions with specific clients or special considerations for WAN (Wide Area Network) environments. Pay special attention to those topics that are directly related to your environment.
- **Sample Implementation**—Describes a specific example of how to use Storage Mirroring for this solution. Use these procedures as a guideline for creating your own implementation. Because no two environments or configurations are exactly the same, you will probably need to implement additional or different steps than what is documented here in order to make the solution work in your environment.

Audience

This document is written for network and application administrators who have a working understanding of the applications and environments where the Storage Mirroring solution is to be deployed. You may need to expand on the documented information in order to customize the solution to fit your environment.

Before you use this application note, you should have an understanding of:

- Storage Mirroring
- Microsoft Virtual Server

Expectations

Application notes are intended to provide a framework for configuring a Storage Mirroring solution in a specific environment and to draw attention to decisions you will need to make when configuring your solution.

Because there are an infinite number of possible configuration, network, and environment scenarios, application notes contain general configuration guidelines as well as an example configuration procedure that has been tested for a specific environment.

This document assumes that you are comfortable working with your operating system, Storage Mirroring, and Virtual Server.

Related documentation

Before you begin to configure your solution, make sure that you have complete documentation for your operating system, application, and Storage Mirroring. This application note does not provide step-by-step instructions for using standard operating system, application, and Storage Mirroring functionality.

The following documents contain additional information that you may need while setting up this solution:

- Storage Mirroring *User's Guide* or online documentation
- Reference guides or documentation for Virtual Server

Getting help

Hewlett-Packard has application notes that describe how to configure Storage Mirroring with a variety of popular third-party applications. These application notes are available on the Storage Mirroring web site: <http://h18006.www1.hp.com/products/storage/software/sm/index.html>.

For help using Storage Mirroring, refer to the Storage Mirroring online manual or online help.

Solution Overview

Microsoft Virtual Server is a virtualization solution that enables multiple operating systems to be run on the same physical server. Uses include:

- Providing system administrators the ability to support and possibly consolidate legacy operating systems and applications on a more current underlying operating system (host)
- Hardware migration and consolidation
- Ability to migrate and/or consolidate non-Microsoft operating systems onto a more familiar underlying Microsoft operating system.

This document describes the steps necessary to configure Storage Mirroring to provide high availability for Windows^{Storage Mirroring} servers running Microsoft Virtual Server 2005. To complete these instructions, you will install Microsoft Virtual Server and Storage Mirroring, and configure Storage Mirroring for real-time replication and failover. Due to the complexities of these applications, this document is intended for network administrators with experience installing, configuring, and maintaining network applications, including Storage Mirroring and Microsoft Virtual Server.

Requirements

- Two licensed copies of Microsoft Windows 2003
- Two licensed copies of Microsoft Virtual Server 2005
- Licensed copies of the operating system(s) and application(s) to be installed on the virtual servers
- Two licensed copies of Storage Mirroring

Modifying the sample script files

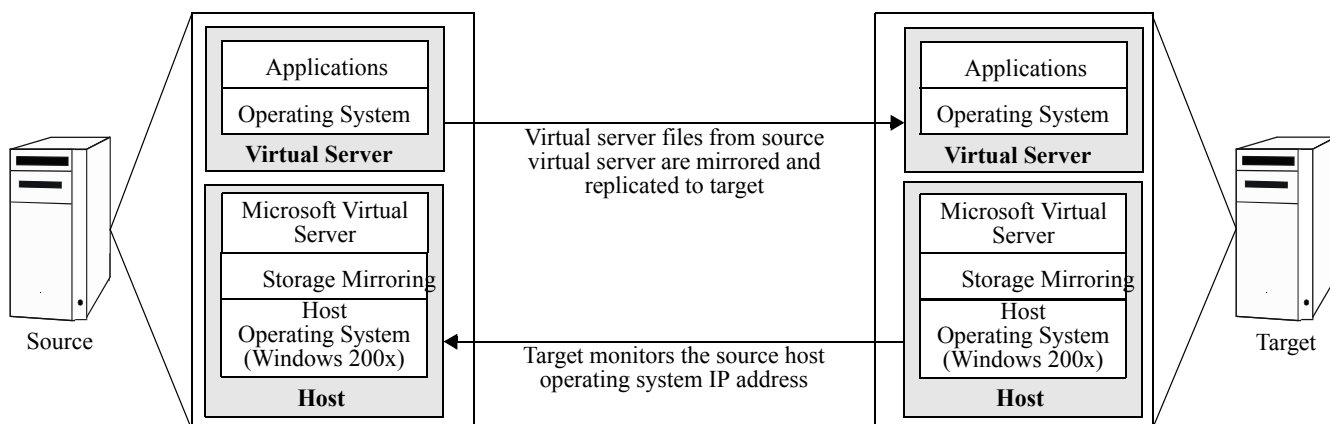
Sample batch files are available at `http://support.doubletake.com`.

After you modify the sample scripts, save them with a new name to remove the `SAMPLE_` prefix. Copy the scripts to the directory where Storage Mirroring is installed.

The sample batch files provided are only examples. Because no two environments or configurations are exactly the same, you **MUST** modify the sample scripts in order to make the solution work in your environment.

Configuration

This solution allows you to install Storage Mirroring on the host operating system on both the source and target. It provides you the ability to maintain an up-to-date backup of the virtual hard disk image(s) from the virtual server(s) on the source. The target will monitor the IP address of the host operating system on the source, and if it fails, the target can stand in for the failed source and the target virtual server will be started.



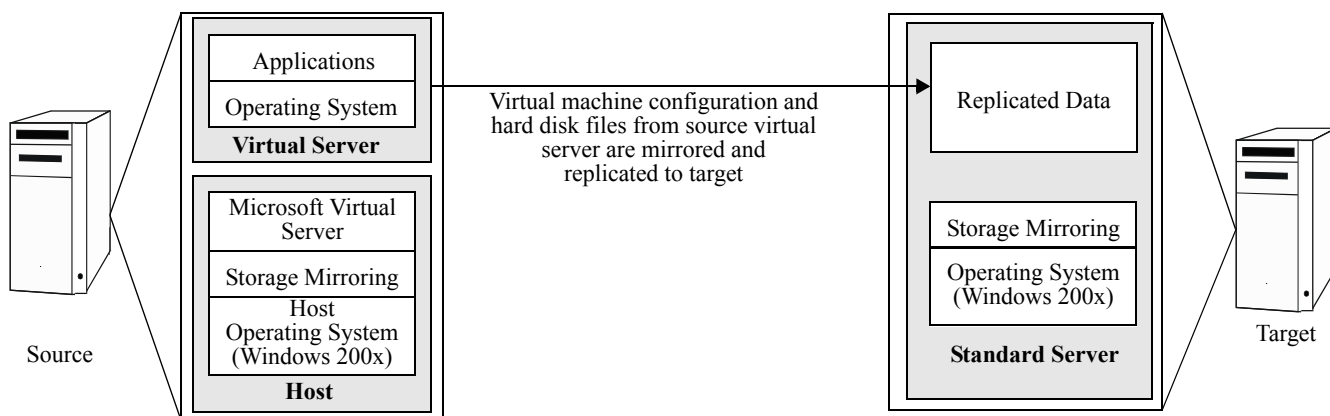
Alternate configuration for disaster recovery

If you are only interested in disaster recovery and do not need high availability, you may want to consider the following configuration.



NOTE: This configuration has not gone through extensive testing and is only provided as a guideline for identifying another solution which may be possible using Storage Mirroring and Microsoft Virtual Server.

If you only want to install Microsoft Virtual Server on the source, you can still protect the virtual hard disk image(s) from the virtual server(s). In this configuration, Storage Mirroring is installed on the source host operating system. The replication set from the source virtual machine is backed up on the target. The target does not contain any virtual machines. Because Microsoft Virtual Server is not installed on the target, this configuration does not support high availability, but in the event of a failure on the source, all of your data will be protected on the target.



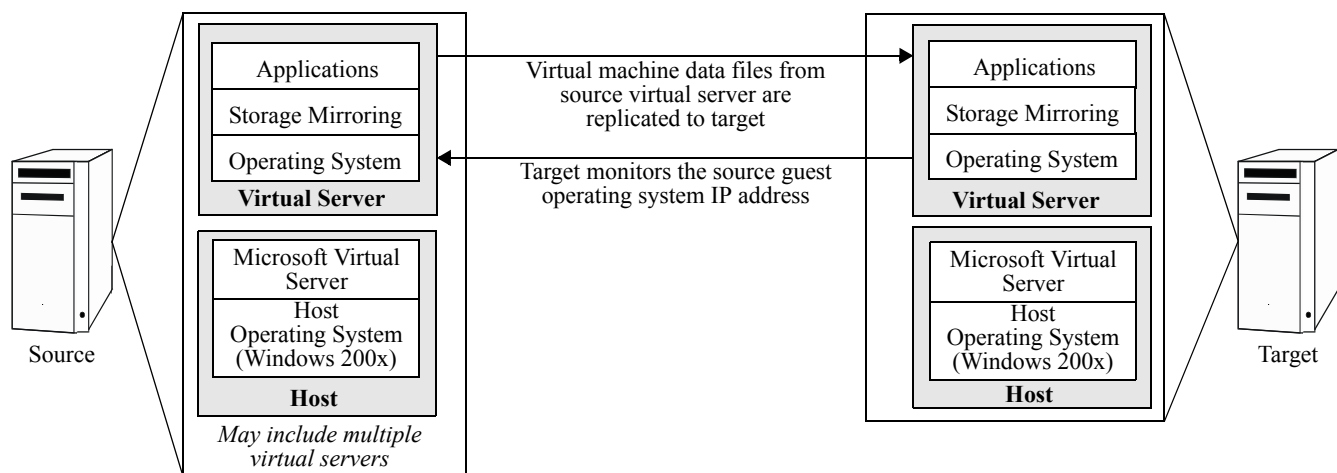
Alternate configuration for high availability

If you want to protect your virtual servers separately, you may want to consider an alternate high-availability configuration.



NOTE: This configuration has not gone through extensive testing and is only provided as a guideline for identifying another solution which may be possible using Storage Mirroring and Microsoft Virtual Server.

By installing Storage Mirroring on the virtual servers on the source and target, you can provide high availability for the virtual machine data files. This configuration would require a licensed copy of Storage Mirroring for each virtual server. With this configuration, Storage Mirroring provides a backup copy of user-selected data from the virtual hard disk image(s) from the virtual server(s) on the source. The target monitors the IP address of the guest operating system on the source, and if it fails, the target can stand in for the failed virtual server(s).



Sample Implementation

This section describes an example of how to configure Storage Mirroring and Virtual Server. Use these procedures as a guideline for creating your own implementation.

Because no two environments or configurations are exactly the same, you will probably need to implement additional or different steps than what is documented here in order to make the solution work in your environment.

Installing and configuring software on the source

1. Install Storage Mirroring on the source using the installation defaults. See the *Storage Mirroring getting started* guide for details.
2. Make sure that you reboot the source after the installation is complete.
3. Install Microsoft Virtual Server on the source, if it is not already installed.

NOTE: Because most servers have limited space available on the boot drive, you may want to select a location on another volume to install the software and to create the virtual machine.

4. Create a Virtual Server Instance, making sure that you create a disk image that is large enough to hold your applications and data.
5. Record the name and location of the disk image file name. This is the `.vhd` file.

Disk image name and location _____

6. Create a virtual server on the source using the hard drive image you just created. It is best if this `.vmc` file is in the same directory as the `.vhd` file.
7. Record the name and location of the virtual server configuration file. This is the `.vmc` file.

Virtual server name and location _____

8. Start the virtual machine instance.
9. Install the operating system and applications on the virtual server on the source.

Installing software on the target

1. Install Storage Mirroring on the target using the installation defaults. See the *HP OpenView Storage Mirroring getting started guide* for details.
2. Make sure that you reboot the target after the installation is complete.
3. Install Microsoft Virtual Server on the target, if it is not already installed.



NOTE: Because most servers have limited space available on the boot drive, you may want to select a location on another volume to install the software and to create the virtual machine.

After Storage Mirroring has mirrored and replicated all of the data, you will need to configure the target.

Configuring mirroring and replication

1. Select **Start, Programs, Storage Mirroring, Management Console**.
2. Double-click your source to log on.
3. Right-click the source and select **Properties**.
4. On the Source tab, enable **Block Checksum All Files on a Difference Mirror** and click **OK**.
5. Right-click your source and select **New, Replication Set** and enter the desired name for the replication set.
6. Select the data to protect. This includes the `.vhd` and `.vmc` files that you recorded in [step 5](#) and [step 6](#) in the "Installing and configuring software on the source" on page 6.
7. Right-click the replication set name and select **Save** to save the replication set.
8. Drag and drop the replication set onto the target. The Connection Manager dialog box opens.
9. The **Source Server**, **Target Server**, **Replication Set**, and **Route** fields will automatically be populated. If you have multiple IP addresses on your target, verify the **Route** field is set to the correct network path. (For detailed information on connecting a source and target, see the *HP OpenView Storage Mirroring user's guide*.)
10. Select One to One to map the replication set data from the source to an identical volume/directory structure on the target. Make sure you select the correct mapping; if the paths do not match exactly, the virtual server on the target will not function correctly..
11. Click **Connect** to start the mirror and replication processes.



NOTE: If you start the replicated virtual server on the target, or if the associated data on the target is otherwise modified, the data on the source and target will no longer match. If the updated data on the target is not needed, perform a full or difference with block checksum mirror from the source to the target. If the updated data on the target is needed, restore the data from the target to the source.

Wait until mirroring is complete and the Mirror Status has changed to **Idle** before continuing with the next section, "[Configuring the target](#)".

Configuring the target

After the mirror has completed, add a virtual server on the target using the configuration file and hard disk file that were replicated to the target in previous steps.



NOTE: If you want to start this virtual server to make sure that it works, you must first isolate it from the network.

Configure failover and begin failure monitoring

1. Select **Start, Programs, Storage Mirroring, Failover Control Center**.
2. If the target you need is not displayed, click **Add Target**, enter the machine name, and click **OK**.
3. Select the target from the list of available machines and click **Login**.
4. To add a monitor for the selected target, click **Add Monitor**. Type the name of the source host server and click **OK**. The Monitor Settings window will open.
5. In the Monitor Settings window, mark the IP address that is going to failover. This is the physical address of the source host operating system.

NOTE: Monitoring is configured for the physical source, not the virtual machine. There is no direct monitoring of the virtual machine. When the physical source fails to respond, failover will occur.

6. Make sure all of the following settings are disabled:
 - **Items to Failover—IP Address(es), Server Name, Share(s)**
 - **Use .SHR Share Mapping File**
 - **Active Directory—Failover Hostname**
7. If a failure occurs, you will want to have the virtual server start on the target automatically. To do this, create a batch file called `postover.bat` using the sample batch file below. Save the batch file to the same directory on the target where your Storage Mirroring files are installed

NOTE: These sample batch files are available on the Storage Mirroring support web.

After you modify the sample scripts, save them with a new name to remove the `sample_` prefix. Copy the scripts to the directory where Storage Mirroring is installed.

The sample batch files provided are only examples. Because no two environments or configurations are exactly the same, you **MUST** modify the sample scripts in order to make the solution work in your environment.

SAMPLE_POSTOVER.BAT

```
REM Sample post-failover script for Microsoft Virtual Server failover
REM This script calls a Visual Basic script which will start Microsoft Virtual Server on the
REM target. Substitute the name of your source virtual server that you want to start on the target
REM in the following command.
cscript vs_start.vbs Source_Virtual_Server_Name
```

8. Create the Visual Basic script used in the post-failover script and save it to the same directory on the target where your Storage Mirroring files are installed.

SAMPLE_VS_START.VBS

```
` Sample Visual Basic script to start Virtual Server on the target after failover
Dim vpcApp, vmCollection, life, objArgs, I, backupVM
main()
  Set objArgs = WScript.Arguments
  For I = 0 to objArgs.Count - 1
    WScript.Echo "The Microsoft Virtual Server - ", objArgs(I), " - is now being started"
    backupVM = objArgs(I)
  Next
  vmCollection.Item(indexForVm(backupVM)).Startup()

Function indexForVm(configName)
` This function takes a VM name as a parameter - and returns the index number of the
` requested VM. If the VM does not exist - it returns -1
On Error Resume Next
dim x
indexForVm = -1
for x = 1 to vmCollection.count
  if lcase(vmCollection.Item(x).Name) = lcase(configName) then indexForVm = x
next
End Function

sub main()
` This subroutine serves as the main program. It establishes a COM connection with the
` Virtual Server and obtains the details of the Virtual Servers. It then prompts for the
` monitor and backup VMs. It then enters "keepAlive" while we wait for any events.
On Error Resume Next
life = 1
Set vpcApp = WScript.CreateObject( "VirtualServer.Application" )
  WScript.ConnectObject vpcApp, "vs_"
Set vmCollection = vpcApp.VirtualMachines
end sub
```

9. After a failure is resolved, you will be ready to bring your source back online. At this time, you will want to stop the virtual server on the target automatically. To do this, create a batch file called preback.bat using the sample batch file below. Save the batch file to the same directory on your target where your Storage Mirroring files are installed.

PREBACK.BAT

```
rem ***SAMPLE*** pre-failback script for Microsoft Virtual Server failover

rem This sample batch file is provided as an example only. Because no two environments or
rem configurations are exactly the same, you MUST modify this script in order to make the
rem solution work in your environment.

rem This script calls a Visual Basic script which will stop Microsoft Virtual Server on the target.
rem Substitute the name of your source virtual server that you want to stop on the target in the
rem following command.
cscript vs_stop.vbs Source_Virtual_Server_Name
```

10. Create the Visual Basic script used in the pre-failback script and save it to the same directory on the target where your Storage Mirroring files are installed.

VS_STOP.VBS

```
`      Sample Visual Basic script to stop Virtual Server on the target during failback

Dim vpcApp, vmCollection, life, objArgs, I, backupVM
main()
    Set objArgs = WScript.Arguments
    For I = 0 to objArgs.Count - 1
        WScript.Echo "The Microsoft Virtual Server - ", objArgs(I), " - is now being stopped"
        backupVM = objArgs(I)
    Next
    vmCollection.Item(indexForVm(backupVM)).TurnOff()

Function indexForVm(configName)
`      This function takes a VM name as a parameter - and returns the index number of the requested VM.
`      If the VM does not exist - it returns -1
On Error Resume Next
dim x
indexForVm = -1
for x = 1 to vmCollection.count
    if lcase(vmCollection.Item(x).Name) = lcase(configName) then indexForVm = x
next
End Function

sub main()
`      This subroutine serves as the main program. It establishes a COM connection with the Virtual
`      Server - and obtains the details of the Virtual Servers. It then prompts for the monitor and
`      backup VMs. It then enters "keepAlive" while we wait for any events.
On Error Resume Next
life = 1
Set vpcApp = WScript.CreateObject( "VirtualServer.Application" )
    WScript.ConnectObject vpcApp, "vs "
Set vmCollection = vpcApp.VirtualMachines
end sub
```

11. Back on the Failover Control Center Monitor Settings dialog box, click Scripts and specify the scripts that were previously created, using postover.bat for the target post-failover script and preback.bat for the target pre-failback script.

NOTE: The scripts are processed using the same account running the Storage Mirroring service.

12. Click **OK** to go back to the Monitor Settings dialog box.

13. Click **OK** to begin monitoring the source machine.

In the event of a source failure, your target is now ready to stand in for the source. For information on monitoring failover, see the *HP OpenView Storage Mirroring user's guide*.

Restoring back to the original source

If your source experiences a failure, such as a power, network, or disk failure, the virtual server on the target will stand in for the source while you resolve the source machine issues.

1. Verify that your source machine is not connected to the network. If it is, disconnect it.
2. Resolve the source machine problem that caused the failure.



NOTE: If you must rebuild your hard drive, reinstall Windows and complete the instructions in "[Alternate configuration for disaster recovery](#)" on page 5, using the same settings as originally used.

3. Select **Start, Programs, Storage Mirroring, Failover Control Center**.
4. Select the target machine that is currently standing in for the failed source.
5. Select the failed source and click **Failback**. The pre-failback script created during the failover configuration will be executed and the virtual server on the target will be stopped.
6. You will be prompted to determine if you want to continue monitoring the source server. Do not choose **Continue** or **Stop** at this time.
7. Connect the source machine to the network.
8. After the source is back online, select whether or not you want to continue monitoring this source machine (**Continue** or **Stop**).



NOTE: Verify that the Storage Mirroring connection on the source has been disconnected (right-click the connection in the Storage Mirroring Management Console and select **Disconnect**).

9. To begin the restoration process, open the Storage Mirroring Management Console and select **Tools, Restoration Manager**.
10. Complete the appropriate fields as described below.
 - **Original Source**—The name of the source machine where the data originally resided.
 - **Restore From**—The name of the target machine that contains the replicated data.
 - **Replication Set**—The name of the replication set to be restored.
 - **Restore To**—The name of the machine where the data will be restored. This may or may not be the same as the original source machine.
11. Identify the correct drive mappings for the data and any other restoration options necessary. For detailed information on the restoration options, see the *HP OpenView Storage Mirroring user's guide*.
12. Verify that the selections you have made are correct and click **Restore**. The restoration procedure time will vary depending on the amount of data that you have to restore.
13. After the restoration is complete, re-establish the replication set connection. For more information, see "[Configuring mirroring and replication](#)" on page 7.

At this time, your data is restored back to your source machine, and if you selected to continue failover monitoring, the target is available to stand in for the source in the event of a failure.